REMARKS

Request for Limited (3-month) Suspension of Action Following RCE

As a preliminary matter, the Applicants respectfully request a limited suspension of action pursuant to 37 C.F.R. § 1.103(a) for three months. This request is (1) filed with an RCE, (2) filed with a submission under 37 C.F.R. § 1.114 and the fee required by 37 C.F.R. § 1.17(e), (3) filed with the fee of $130.00 specified by 37 C.F.R. § 1.17(i).

Objection to the Specification

The Specification has been amended to remove the reference numeral 5 following grooves on p. 9. Reconsideration of the objection is respectfully requested.

Claim 8 has Written Description Support

The Office Action rejected claim 8 under 35 U.S.C. § 112 ¶1 for lack of written description support. Reconsideration of the rejection is respectfully requested.

The specification clearly teaches the application of an amorphous Germanium layer by sputtering or vapor deposition followed by the application of a metal layer at page 6, l. 31 – p. 7, l. 9. The method does not recite that the layer is subsequently doped, but rather that the metal electrode is "subsequently" applied, whereas the doping step for the Boron doped layer at the opposite side of the detector is specifically recited. *See* p. 7, ll. 7-9. The Applicants must be able to claim at least that which is specifically recited: an undoped amorphous layer deposited prior to metallization. Withdrawal of the rejection is therefore respectfully requested.

Claims 1 and 3-12, As Amended, are Patentable Over Hamacher, *et al.* in View of Luke, *et al.*

The Office Action rejected claims 1 and 3-12 under 35 U.S.C. §103(a) over Hammacher, *et al.* in view of Luke, *et al.* Applicants respectfully submit that the rejections are improper. Reconsideration is respectfully requested.

Applicants respectfully submit that a person of ordinary skill in the art, beginning with the teachings of Hammacher, *et al.* would not have applied the teachings of Luke, *et al.* to form a structured amorphous layer, as there would be no motivation to combine the two teachings to reach the structure of claim 1 or the method of claim 12.

Hammacher, *et al.* shows, in Fig. 1, "the essential steps used in fabricating position-sensitive detectors" (p. 129). Fig. 1 shows a chemically polished semiconductor material doped on the top side by Boron and on the bottom side by Phosphorous (or Li as noted on page 129). The Boron-doped side of the semiconductor material is evaporatively coated with Aluminum, and then structured through a lithographic process.

Luke, *et al.* shows the use of amorphous Germanium as a blocking contact. However, the combination of Luke *et al.* with Hammacher, *et al.* would not have been undertaken. First, Hammacher states that the steps shown in Fig. 1 are "essential", thus teaching away from modification. Further, Hammacher, *et al.* show only that the Boron-doped side of the detector has a structure that is "transfer[red] into the semiconductor material by etching." Thus, there is no teaching of advantage of transferring the structure into the material that would per se lead a person of ordinary skill in the art to replace an electrode with amorphous Germanium and have the structure of the metallic layer.

Applicants also reiterate their argument that it was understood in the art that an intact covering amorphous Germanium layer was beneficial, because it provided a passivation layer. There would thus be no motivation to structure the electrode of Luke, et al. In that respect, Hansen, *et al.* was cited by the applicant to demonstrate this belief in the art.

The most recent office action reasons that (1) Hansen *et al.* teach that a passivation effect can be provided by mounting in the final system; and (2) due to leakage currents that occur at high temperatures, amorphous passivation layers may not be advantageous under all conditions.

In response to these two points, the Applicants respectfully submit the following:

(1) Whether it can be inferred from Hansen, *et al.* that careful mounting in certain final systems will prevent further degradation is irrelevant, if overall, Hansen, *et al.*

demonstrate the Applicants' belief that a person of skill in the art would have considered an intact passivation layer advantageous. In this respect, Hansen *et al.* very clearly teach that a passivation layer is desirable, *e.g.*:

> [t]he wide application of germanium devices has always been limited, in part, by the lack of a stable, passivating native oxide. since the days of the very first transistors, various surface treatment and encapsulation methods were used in an effort to achieve long term stability of operating characteristics. Ultimately none of these methods proved satisfactory and germanium devices have been relegated to a tiny nitch in the semiconductor industry where some special characteristic of germanium makes the lack of stability tolerable.
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> Hansen *et al.* p. 247.

That is, it is not relevant whether Hansen, *et al.* says that lack a passivation layer can be tolerated in certain conditions. It is relevant, however, that Hansen *et al.* state that an amorphous Germanium passivation layer is, on balance, a desirable feature.

(2) With regard to the second point, the Applicants respectfully reiterate that the position of the Office Action does not make sense. When Hansen, *et al.* speaks of a "bare device" with better leakage current performance at high temperature, it is speaking of a device without an amorphous Germanium layer at all, not a device as in claim 1 with an amorphous layer underneath the metal contacts. The leakage current described on p. 250 of Hansen, *et al.*, refers to leakage current through the metal contacts on the amorphous Germanium layer, not through an air- or dielectric-filled gap between channels in the device of claim 1, where the resistance is exceedingly high. Thus, a person of ordinary skill in the art would not have considered removing an amorphous layer from the grooves, because he would have believed it would sacrifice the passivation effect there. He especially would not have considered uncovering the grooves while still leaving the amorphous Germanium underneath the metal contacts, because he would have believed that would sacrifice the passivation effect while still causing higher leakage currents at high temperatures. Thus, and respectfully, no person of ordinary skill in the art would have been motivated by Hansen, *et al.* to add an amorphous

layer underneath the metal contacts and structure the contacts such that the amorphous material is removed from the sides of the grooves. Only the present application teaches that it is advantageous to use this structure.

In this regard, two facts are particularly significant. First, there is no teaching in the prior art that a device according to claim 1 has been built. The structure proposed by the Examiner under 35 U.S.C. § 103 is hypothetical. The Examiner assumes that a person of skill in the art would take the teaching of a structured, Boron-doped layer and replace it with a structured amorphous Germanium layer. If the Applicants demonstrate that a clear teaching existed in the prior art not to do so, as in this case, the Examiner should take that into account. Second, Luke, *et al.* themselves teach that a passivation layer is advantageous, and do not teach structuring the electrodes to remove the passivation layer:

> In fact, the sputtering parameters were identical to those used by our group in the deposition of a-Ge for Ge detector surface passivation [8]. Because of this, the a-Ge coating which was also deposited on the side of a device during formation of the a-Ge was left intact to function as a surface passivation layer.
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> Luke, *et al.* at p. 590.

Thus, Luke *et al.* teach away from combination with Hammacher, *et al.*

These arguments apply to method claim 12, as well as claims dependent from claim 1. Applicant therefore believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to

charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By _____

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